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INSIDER

Newsletter for the Employees of Ames Laboratory ■ Volume 18, Number 1 ■ January 2007

2006 — A Great Year for Ames Lab

Looking back on a terrific 12 months

From an updated lead-free solder alloy in January to the signing of a new contract in December, 2006 proved to be another year of distinction for Ames Laboratory and its employees. It's time once again to recall some of the many highlights and give ourselves a pat on the back for the outstanding work we did!

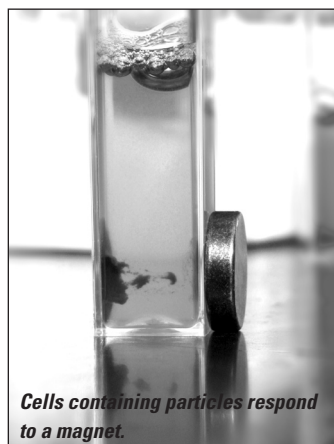
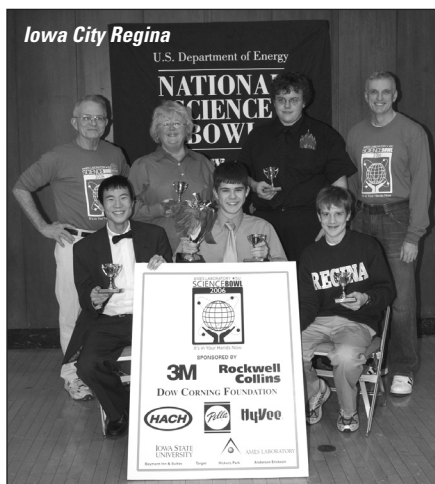
January 2006

Improved Lead-free Solder – The addition of zinc to Ames Laboratory's patented tin-silver-copper lead-free solder should improve the durability of solder joints, especially joints that have aged at high temperatures. Senior metallurgist Iver Anderson says interest in the solder grew with the European Union's enforcement of tough, new regulations banning the use of lead and other hazardous materials in electronics sold in Europe after July 1, 2006.

February 2006

ISU's Top Administrators Visit Ames Lab – ISU President Gregory Geoffroy, Provost Ben Allen and Vice Provost for Research John Brighton saw some of Ames Laboratory's outstanding research efforts when they toured the Lab with Director Tom Barton and other members of the Lab's Executive Council. The tour included presentations on left-handed materials, lead-free solder, photonic band gap crystals, and the use of mesoporous silica nanoparticles for drug-delivery systems.

Iowa City Regina Wins the 2006 High School Science Bowl – Iowa City Regina defeated Ames twice in the finals to earn the right to represent the Ames Laboratory/Iowa State University Region in the U.S. Department of Energy's National Science Bowl, April 28-May 2, in Washington, D.C.



March 2006

Nanoscale "Capsules" for Drug-delivery – Ames Lab chemist Victor Lin has found a way to use nanoscale capsules to deliver a dose of chemotherapy drugs to specific cancer cells without the risk of side effects to health cells. Using tiny silica particles called mesoporous nanospheres to carry drugs inside living cells, Lin is studying different methods to control whether the particle delivers its pharmaceutical payload.

Lab Gets Dollars from Grow Iowa Values Fund – Four Ames Lab researchers, George Kraus, John Verkade, Victor Linn and Surya Mallapragada, are among the first winners of a grant contest designed to advance Iowa State University's economic development efforts.

John Corbett Turns 80 – Subjected to more than a few good-natured "zingers" from Director Tom Barton, senior chemist John Corbett sailed gracefully through his 80th birthday celebration put on by his Ames Lab friends and co-workers.

April 2006

Ottumwa Wins Middle School Science Bowl – Evans Middle School of Ottumwa defeated Urbandale in the championship match of the academic competition to win the third annual Ames Laboratory/Iowa State University Regional Middle School Science Bowl. Notre Dame Middle School of Burlington won the Fuel-cell Car Challenge portion of the competition.

Employees Attend Counterintelligence Class – Ames Lab employees attended presentations on the threat we face from terrorism given by Mark Hanneman, senior counterintelligence officer and manager of the U.S. Department of Energy's Office of Counterintelligence at the Richland Regional Office. *continued on page 2*

May 2006

Marking the Milestones – The annual service awards luncheon was held for employees with 10, 15, 20, 25, 30, 35, 40 and 45 years of service to Ames Laboratory. The luncheon took place in the Memorial Union Campanile Room and was hosted with great spirit by Director Tom Barton, who called Ames Lab a “quality product.”

Blood Drive a Success – Ames Laboratory and IPRT donated 49 units of blood to the American Red Cross during the blood drive held in 205 TASF on May 24.

June 2006

New STEM Installed – Researchers at Ames Laboratory are now able to see the atomic structure of materials with unprecedented clarity thanks to a new \$1.8 million scanning transmission electron microscope that's been installed on the second floor of Wilhelm Hall.

Low-temperature Lab – Take a state-of-the-art dilution refrigerator capable of reaching temperatures as low as seven thousandths of a Kelvin above absolute zero, a magneto-optics system, and a tunnel diode resonator that provides experimental sensitivity exceeding commercial setups by orders of magnitude and you have almost all the makings of Ames Laboratory's exceptional low-temperature lab – but not quite. The unique measurement techniques applied by physicist Ruslan Prozorov complete the package that provides Prozorov with critical information about the physical properties of various materials.



July/August 2006

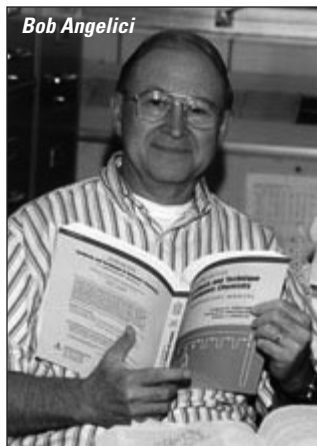
Lab Gets 16th R&D 100 Award – Ames Laboratory and Iowa State University researchers Mark Bryden, Gerrick Bivins and Doug McCorkle won a 2006 R&D 100 Award for their development of a novel software engineering tool that greatly eases the problem-solving and decision-making processes for engineers. Their software tool, Texture-Based Engineering Tools, or TBET, provides an unrivaled means of interacting with large 3-D data sets to tackle complex engineering projects.



SULI Students Complete Internship Program – Ten undergraduate students completed Ames Lab's Science Undergraduate Laboratory Internship, SULI, program sponsored by the Department of Energy's Office of Science. SULI is a nationwide program to bring students interested in careers in science and engineering into DOE laboratories to conduct research under the mentorship of laboratory scientists.

September 2006

Steganalysis – Detecting Secret Files – Steganalysis, the emerging science of detecting secret files lurking within digital images, got a boost from the Midwest Forensics Resource Center and Iowa State University researchers Jennifer Davidson and Clifford Bergman. With support from the MFRC, the ISU team developed a method of using very simple stego techniques to try to find statistical measures that can be used to distinguish an innocent image from one that has hidden data.



Angelici Recognized by ACS – Robert Angelici, an Ames Laboratory senior chemist and an Iowa State University Distinguished Professor of chemistry, was selected by the American Chemical Society to receive the ACS Award for Distinguished Service in the Advancement of Inorganic Chemistry.

Funds for Computational Science – Ames Laboratory is one of 30 recipients nationwide to receive a share of \$60 million in DOE award money for computational science projects over the next three to five years. The projects will accelerate such research efforts as designing new materials and developing future energy sources. The awards are part of the Scientific Discovery Through Advanced Computing-2, or SciDAC-2, program, sponsored by the DOE Office of Science's Advanced Scientific Computing Research program.



October 2006

Anderson Named Iowa Inventor of the Year – The Iowa Intellectual Property Law Association named senior metallurgist Iver Anderson as its 2006 Inventor of the Year. The award is given to an Iowa inventor who has made the most outstanding contribution to Iowa through his or her invention. Anderson developed a lead-free solder alloy consisting of tin, silver and copper that was patented in the United States in 1996 and in 2001.

Trivedi Honored with Special Symposium – Rohit Trivedi was recognized for his role as the “solid” part of solidification research over the past four decades with a symposium in his honor. “Critical Issues and Future Directions in Solidification Science” was held Sept. 20-22, at Iowa State University. *continued on page 7*



Ames Laboratory – Shaping Science for 60 Years

*A*mes Laboratory will be 60 years old officially on May 17, 2007. To help celebrate the Lab's achievements, *Insider* will feature a time line of significant Laboratory events that took place in each decade. The time line began with the 1940s in the November 2006 issue of the newsletter and will conclude with the 2000s in the May 2007 issue. The time line is based on historical documents and information taken from the various Ames Lab employee newsletters: *Insider*, *Changing Scene* and *Ames Laboratory News*.

In this installment of the Ames Laboratory time line, we'll examine the 1960s – a period of reorganization that brings the operation of the Lab more in line with university standards. Near the close of this decade, Frank Spedding reaches the then mandatory retirement age of 65 and is forced to step down from his position as director of Ames Laboratory and the Institute for Atomic Research. Robert S. Hansen becomes the new director for both organizations.

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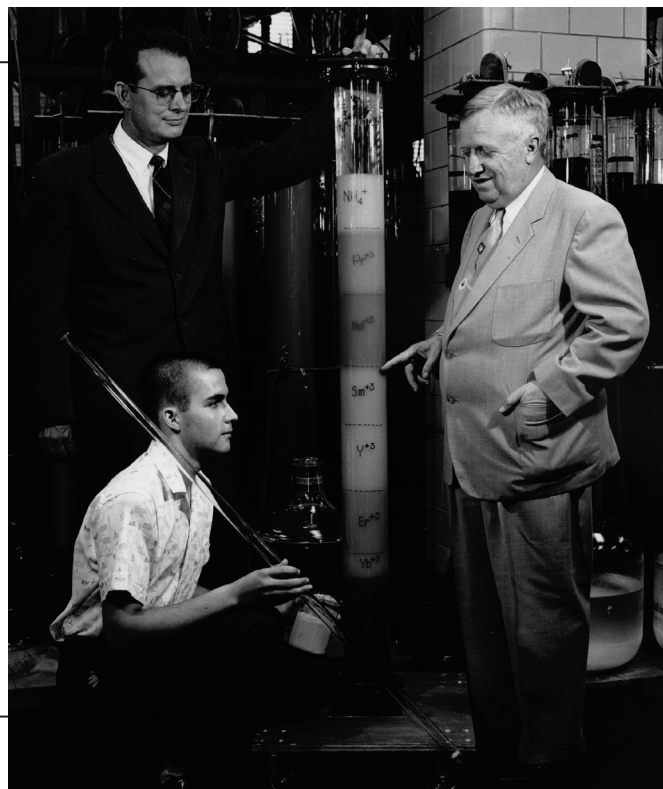
Ames Laboratory workers get an introduction to the Loewy extrusion press. The press could apply 700 tons of force to a billet that it forced through the extrusion die. (left to right) Paul DeJong, Charles Owen, Loewy representative and Les Reed.

1960^s

The 1960s – reorganization

- Hilton brings the Ames Laboratory further under university control by requiring that the Lab conform to university standards. He insists that the Lab adopt the university's salary scale, although this costs the Laboratory promising talent.
- Ironically, the requirement that the Lab conform to university standards does more to limit Spedding's power than anything else. The Iowa State retirement policy requires mandatory retirement at age 65. Accordingly, the university demands that Spedding retire from administrative duties in 1968. A few short years later Wilhelm is forced to step down for the same reason.

Frank Spedding (right) examines a demonstration column showing the separation of the rare earths with senior chemist Jack Powell (standing) and summer student trainee Tom Erskine. This photo was featured in color in a 1963 Sunday edition of the Des Moines Register.



1962-63

- Ames Lab begins using ISU's new IBM 7074 computer. The 7074 is a very modern, high-speed transistorized computer. The 7074 is magnetic-tape-oriented and includes 20,000 words of core memory, 99 indexing registers, built-in floating point instructions, two buffered input-output tape channels, six 729 II magnetic tape units, and six 729 IV magnetic tape units.
- Ames Laboratory employees win the Atomic Energy Commission Award of Merit for operating 2,096,630 man-hours without a disabling injury during the 22-month period from August 1961 to June 1962.
- Twenty-three employees gather at the site of Little Ankeny and reminisce about the days when a uranium production plant stood there. A boulder now marks the spot between the Dairy and Food Industries building and the ISU Press building where the secret program was carried out during World War II. The plaque on the boulder is inscribed: "On this site between 1942 and 1946, over 2,000,000 pounds of uranium metal were produced for the Manhattan District Associates."
- Ames Lab scientists develop a process to produce thorium with a purity of 99.985 percent.

- The Research Reactor Facility is dedicated in May 1963 in ceremonies featuring Atomic Energy Commission chairman Glenn Seaborg.
- Iowa Governor Harold Hughes visits Ames Laboratory on Sept. 16 and takes a tour of the research reactor with Director Frank Spedding and ISU President James Hilton.

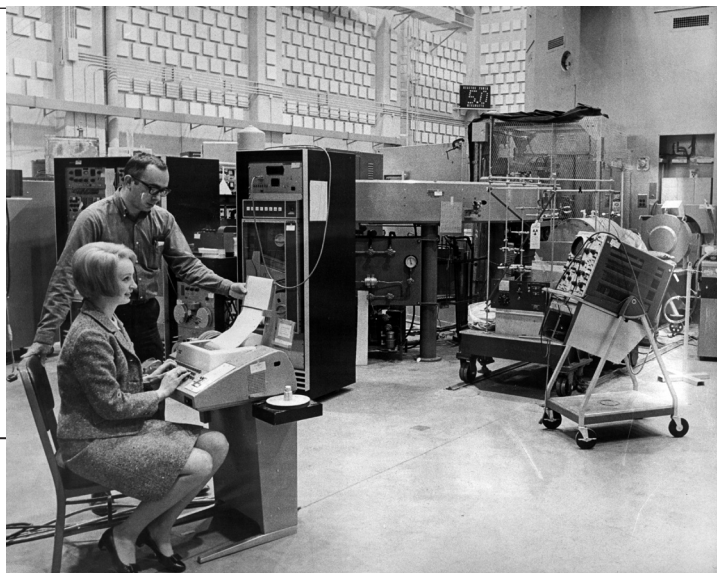


Twenty-three employees gather at the site of Little Ankeny in July 1963 to reminisce about the days when a uranium production plant stood there.

A reactive typewriter (tied to a computer system) allows more flexibility in the control of reactor experiments in the early 1960s. The device made it possible for a researcher to make changes in an experiment without halting the operations of the computer system and all the experiments controlled by the system.

1961

- Construction begins on the Ames Laboratory Research Reactor Facility, a \$4.3-million building funded through the AEC.
- Frank Spedding receives Iowa's Distinguished Citizen's Award from Governor Norman Erbe at a ceremony in Des Moines, Iowa.
- A 9-kilowatt electron-beam melting furnace is constructed and operational in Metals Development. The furnace is able to melt samples of refractory metals such as tantalum, columbium, thorium, vanadium, tungsten and yttrium into button or small ingot forms.
- The final installation of the 700-ton extrusion press in Metals Development is completed with the successful extrusion of several copper billets. The installation opens a new area of investigation for Ames Lab and will help researchers learn more about how to fabricate new metals and alloys of interest.



- Sixty-seven rare and common metals valued at \$10,000 go on display in Spedding Hall. The periodic chart of metals will be a permanent exhibit.
- Ames Lab installs an IBM 66-card transceiver that will make it possible to use the powerful Midwest Universities Research Association's, MURA's, IBM 704 computer in Madison, Wisc. The IBM 66-card transceiver uses regular telephone lines on a per-message basis through the Bell system data phone service. IBM cards punched with alphanumeric information can be transmitted to and from the MURA computer.

1965-66



Frank Spedding (right) meets with Karl Gschneidner, director of the Lab's Rare-earth Information Center, which was established in 1966.

- The Research Reactor reaches initial criticality on Feb. 17, 1965, when, with a fuel-loading of about four pounds of uranium-235, a controlled, self-sustaining chain reaction is achieved. The reactor reaches its authorized power level of 5,000 kilowatts on July 12.
- The search for pure materials for nuclear applications results in a process for producing high-purity vanadium metal.
- The Atomic Energy Commission's Division of Technical Information establishes the Rare-earth Information Center at Ames Laboratory with Karl Gschneidner in charge.
- Ames Lab's Reactor Division staff observe the first anniversary of initial criticality of the research reactor on Feb. 17, 1966.
- The Research Reactor produces the first successful operation of an isotope separator connected to a reactor for the purpose of studying short-lived radioactivity produced by fission of uranium-235.
- Ames Lab researchers discover a new isotope, copper-69, that is produced by bombarding an enriched sample of zinc-70 with X-rays from the ISU synchrotron.
- Robert W. Parks is inaugurated as Iowa State's 11th president on March 22, 1966.

- Refueling of the Ames Lab Research Reactor takes place the week of January 9. A total of 21 fuel elements are replaced during refueling, the first since the reactor went into operation in February of 1965.
- Workers transfer the liquid nitrogen storage tank from the warehouse to the northwest corner of the Physics Building addition.
- Glenn Seaborg, chairman of the U.S. Atomic Energy Commission, announces the selection of Frank Spedding as one of three distinguished Americans to receive the Atomic Energy Commission Citation for outstanding service in the nation's atomic energy program.

Commissioner Gerald Tape (left) presents Frank Spedding with the Atomic Energy Commission Citation Award, Sept. 13, 1967.

1967



1968

- Frank Spedding lights the 1968 VEISHEA torch and gives the torch-lighting address.
- At the age of 65, Frank Spedding steps down as director of both the Ames Laboratory and the Institute for Atomic Research, but continues at the Lab as a senior scientist.
- On July 1, 1968, Robert S. Hansen, chief of the Lab's chemistry division and an ISU chemistry professor, becomes the director of the Ames Laboratory and the Institute for Atomic Research.
- The use of identification badges is discontinued at Ames Laboratory, and badge racks are removed from the entrances to Research (Spedding), Metallurgy (Wilhelm) and Metals Development on Aug. 26, 1968.
- In September 1968, construction begins on the \$100,000 laboratory wing addition to the Ames Laboratory Research Reactor.
- Ames Lab physicists succeed in growing the first large crystal of solid helium.
- A display of three sets of 24 metals produced by processes developed at Ames Laboratory are sealed in three time columns at Amarillo, Texas, during the centennial observance of the discovery of helium gas. One column will be opened in 25 years, another in 100 years, and the final column at the end of 1,000 years. The display sets each contain a brief description of the processes developed at the Lab and an overview of the Lab and its history.
- As the 1960s draw to a close, so, too, do Ames Laboratory's post Manhattan Project glory days. The mandatory retirement of Spedding and Wilhelm mark the end of an era in which Ames Laboratory, the IAR and Frank Spedding basically dominate the distribution of power at Iowa State.



2006 — A Great Year *continued from page 2*

November 2006

Remembering Harry Svec – Harry Svec, a former Ames Lab program director and Manhattan Project worker, died on Nov. 28 in Ames. Svec earned his Ph.D. from Iowa State in 1950 and went on to hold a dual role as a faculty member and an Ames Laboratory researcher. He gained an international reputation for the use of mass spectrometry to settle questions in physical, inorganic and analytical chemistry.

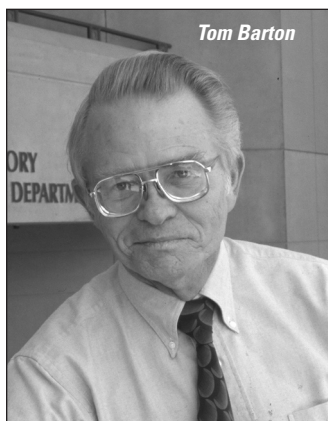
Barton Supports Special Exposure Cohort Petition – In an October 25 letter to Larry Elliott, director, Office of Compensation Analysis and Support at the National Institute for Occupational Safety and Health, Ames Laboratory Director Tom Barton stated his support of a petition to include employees of Ames Laboratory and Iowa State University in a Special Exposure Cohort. The SEC, as part of the Energy Employees Occupational Illness Compensation Program Act, would provide medical and financial assistance to workers exposed to hazardous materials.



December 2006

ISU and DOE Sign Ames Laboratory Contract – Months of speculation came to an end on Dec. 4 when the U.S. Department of Energy announced the winner of the bid to manage and operate the Ames Laboratory contract for the next five years. To no one's real surprise,

Iowa State University was awarded the five-year, \$150 million contract.



Tom Barton Steps Down as Ames Lab and IPRT Director – Thomas J. Barton, Ames Laboratory director and director of the Institute for Physical Research and Technology at Iowa State University, announced his resignation effective Feb. 28, 2007. Barton has served as director of the Ames Laboratory since 1988 and director of IPRT since 1998. Barton, who holds the title of Distinguished Professor, will return to ISU's chemistry faculty. Commenting on his decision to step down, Barton said, "To say that it has been both an honor and a

privilege to be a part of this unique and incredibly successful enterprise would be a gross understatement. My heartfelt thanks go out to each and every one of you for giving me the opportunity to work with this truly outstanding group of people."

Holiday Auction – The silent and live auctions brought in a record-high amount of \$3,644 for this year's beneficiary, the Story County Emergency Residence Project. The local charitable organization will use the funds to help struggling area families remain in their homes and keep the utilities turned on.

United Way campaign a success

The final numbers are in, and Ames Laboratory/IPRT employees raised \$13,814 in 2006 to support the United Way of Story County. The Lab/IPRT goal was \$13,000 in 2006, which was up from \$10,500 in 2005.

The Lab and IPRT also helped ISU surpass its goal of \$271,000. Altogether, university employees



United Way of Story County

contributed \$271, 047 to the 2006 campaign.



(center) Bob Mills, IPRT Public Affairs, is left holding the bag (of rice, that is) as he and Steve Karsjen unload gifts of food and hats and mittens on a cart operated by (left) Daniel Ferguson, a MICA family-development worker. The Ames Lab and IPRT gifts were welcome as MICA helped over 200 families through its food pantry this past Christmas.



With appreciation, Vic Moss, executive director, Story County Emergency Residence Project, accepts a \$3,644 donation from the Ames Laboratory/IPRT Holiday Auction presented by Director Tom Barton. In 2006, ERP assisted over 2,000 people through its shelter, rental and utilities assistance, and transitional housing programs.

Search Committee Formed for New Ames Laboratory Director

The following individuals make up the committee to select a new director of the Ames Laboratory.

Search committee chair:

- Bruce Thompson, ISU Distinguished Professor of Materials Science and Engineering and director of the Center for Nondestructive Evaluation

Committee members:

- Iver Anderson, Ames Laboratory senior metallurgist and ISU adjunct professor of Materials Science and Engineering
- Diane Birt, ISU Distinguished Professor of Food Science and Human Nutrition
- Cynthia Jenks, Ames Laboratory scientist
- Mark Kushner, Dean of the ISU College of Engineering
- Richard LeSar, professor and chair, ISU Department of Materials Science and Engineering
- Jacob Petrich, professor and chair, ISU Department of Chemistry
- Eli Rosenberg, professor and chair, ISU Department of Physics and Astronomy
- Costas Soukoulis, ISU Distinguished Professor of Physics and Astronomy and Ames Laboratory senior physicist
- Pat Thiel, ISU Distinguished Professor of Chemistry and Ames Laboratory senior chemist
- Michael Whitford, Dean of the ISU College of Liberal Arts and Sciences
- Ed Yeung, ISU Distinguished Professor of Chemistry and Ames Laboratory program director of Chemical and Biological Sciences

A Valentine for Your Heart

Occupational Medicine will be offering blood pressure, pulse and/or weight checks to employees on Wednesday, Feb. 14, from 1:30 to 3:30 p.m. Be kind to your heart – stop by G22 TASF on Valentine's Day.



(left to right) Diane Drake, Lora Larrance, Ila Haugen, Tom Stein, Mike Porter, Pat Emley, and Linda Claussen.

A Taste of Heaven from the Hjortshojs

The Budget office staff managed to keep their hands off these beautiful muffins just long enough for John Hjortshoj to snap this picture of them receiving their first installment of 12 months of homemade treats provided by his wife, Sharon. During the Lab's annual Holiday Auction in December, the year's worth of treats resulted in a spirited bidding war between Ila Haugen, representing the Budget office, and Larry Jones, representing the Materials

Preparation Center. Haugen and her co-workers finally won out with their bid of \$500 – the largest bid ever in Holiday Auction history. But the money all went to a good cause – the Story County Emergency Residence Project – and the Budget folks are, needless to say, thrilled with the whole transaction!

(By the way, the good-hearted Hjortshojs also brought muffins to the MPC staff in January.)

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